

REMARKS

Claims 1-20 are pending in the present application. Claims 1, 10 and 19 are amended. Support for the amendments to the claims may be found at least on page 4, lines 3-15 and on page 12, line 28 through page 13, line 21 of the present specification. Reconsideration of the claims is respectfully requested.

I. 35 U.S.C. § 103, Alleged Obviousness Based on Kuwata

The Office Action rejects claims 1, 3, 10 and 19 under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Kuwata* (U.S. Patent Number 6,145,067). This rejection is respectfully traversed.

As to claims 1, 10 and 19, the Office Action states:

As to claim 1, Kuwate teaches the invention substantially as claimed including a device (physical disks, col 3, ln 25-30), device information (an external request, col 2, ln 21-28/ col 3, ln 10-17/ col 6, ln 35 section, col 2, ln 21-30/ col 3, ln 1-17/ col 6, ln 35-40), transforming the device into a logical disk (logically divided into P-EXTENTS 141, 142, 143, 144. The P-EXTENT 141, 142, 143 and 144 constitute one logical disk, col 3, ln 25-30/ the logical disk is reconfiguration, col 2, ln 30-35), based on the device information (reconfiguring the logical disk in accordance with a request from the external interface section 11, col 3, ln 10-17). Kuwate does not explicit teach the term “a device driver”. However, Kuwate teaches a device driver (a controlling section, col 3, ln 1-15). It would have been obvious to one of the ordinary skill in the art at the time the invention was made to apply the teaching of Kuwate because Kuwate’s controlling section would provide the controlling an access to the logical disk in according with a request from the external interface section 11.

As to claims 10, 19, they are apparatus claims of claim 1; therefore, they are rejected for the same reason as claim 1.

Office Action dated June 2, 2004, pages 2-3.

As amended, claim 1, which is representative of the other rejected independent claims 10 and 19 with regard to similarly recited subject matter, reads as follows:

1. A method for providing device management in a logical volume management system, comprising:
 - receiving device information from a device driver for a device; and
 - transforming the device into a logical disk based on the device information from the device driver, wherein the device is transformed into the logical disk prior to creating any logical partitions for the device; and
 - modifying the logical volume management system to create the logical partitions for the device from the logical disk. (emphasis added)

Kuwata does not teach or suggest transforming a device into a logical disk based on device information from a device driver, wherein the device is transformed into the logical disk prior to creating any logical partitions for the device and modifying a logical volume management system to create logical partitions for the device from the logical disk. Furthermore, it would not have been obvious to modify *Kuwata* to include such features.

Kuwata is directed toward a disk array device that can dynamically reconfigure a logical disk without stopping normal processing and can distribute accesses to the overall device even if a physical disk is added afterward. The disk array apparatus includes a plurality of physical disks forming a physical disk group that is logically divided into a plurality of unit areas. The unit areas are combined into a logical disk. The disk array device includes a controller section that controls access to a logical disk and reconfiguration of a logical disk in accordance with an external request.

Kuwata does not teach or suggest that a device is transformed into a logical disk prior to creating any logical partitions for the device as recited in the claims of the present invention. Further, *Kuwata* does not teach or suggest that a logical volume management system is modified to create logical partitions for the device from the logical disk, as recited in claims 1, 10 and 19. In the claims of the present invention, the logical volume management system is modified to create logical partitions from a logical disk rather than a physical disk. To the contrary, *Kuwata* teaches that a group of physical disks are logically divided into unit areas and that the logical unit areas are combined to form a logical disk.

In the rejection of claim 1, the Office Action refers to the following portions of *Kuwata*:

In order to achieve the above object, according to the present invention, there is provided a disk array apparatus including a plurality of physical disks forming a physical disk group which is logically divided into a plurality of unit areas, the unit areas being combined into a logical disk, comprising a control section for controlling an access to the logical disk in accordance with an external request, a reconfiguration executing section for reconfiguring the logical disk in accordance with an external request, data copying means for copying data from a unit area as a reconfiguration source to a unit area as a reconfiguration destination when the logical disk is reconfigured, read means for reading out data from a unit

area, write means for writing data in a unit area that is not being reconfigured, and double write means for writing data in both the unit area as the reconfiguration source and the unit area as the reconfiguration destination when the data is written in the unit area that is being reconfigured.

Kuwata, column 2, lines 21-38.

The controller section 12 is made up of a control section 121 for controlling an access to the logical disk in accordance with a request from the external interface section 11, a read means 122 for reading out data from a continuous area (to be referred to as a P-EXTENT hereinafter), on the logical disk, which is ensured to be used for a specific data set, a write means 123 for writing data in a P-EXTENT which is not being reconfigured, a double write means 124 for writing data in both a P-EXTENT as a reconfiguration source and a P-EXTENT as a reconfiguration destination when data is written in the P-EXTENT that is being reconfigured, a logical disk reconfiguration executing section 125 for reconfiguring the logical disk in accordance with a request from the external interface section 11, and a P-EXTENT copying means 126 for copying data from a P-EXTENT as a reconfiguration source to a P-EXTENT as a reconfiguration destination when the logical disk is reconfigured.

Kuwata, column 3, lines 1-17.

As shown in FIG. 1, physical disks 145, 146, and 147 belong to the RANK 14 as a group of physical disks. The RANK 14 is logically divided into P-EXTENTS 141, 142, 143, and 144. The P-EXTENTS 141, 142, 143, and 144 constitute one logical disk.

Kuwata, column 3, lines 25-30.

divided into a plurality of unit areas, the unit areas being combined into a logical disk, comprising:
a control section for controlling an access to said logical disk in accordance with an external request;
a reconfiguration executing section for reconfiguring the logical disk in accordance with an external request;

Kuwata, column 6, lines 35-40.

These cited portions of *Kuwata* only teach that a plurality of physical disks, forming a physical disk group, are logically divided into a plurality of unit areas. The unit areas are combined into a logical disk. A logical disk is reconfigured by copying data from a unit area as a reconfiguration source to a unit area as a reconfiguration destination. *Kuwata* does not teach or suggest transforming a device into a logical disk prior to creating any logical partitions for the device. To the contrary, *Kuwata* teaches

logically dividing physical disks into unit areas and then combining the unit areas into a logical disk. *Kuwata* does not generate unit areas from a logical disk and thus, does not teach transforming the device into a logical disk based on the device information from the device driver prior to creating any logical partitions for the device. To the contrary, *Kuwata* teaches an opposite operation where physical disks are divided into logical units and these logical units are combined into a logical disk. The present invention, as recited in claim 1, recites transforming a physical disk prior to creating logical partitions for the physical device.

Further, *Kuwata* does not teach or suggest that a logical volume management system is modified to create logical partitions from the logical disk. The claims of the present invention recite creating logical partitions from the logical disk. To the contrary, *Kuwata* teaches dividing a group of physical disks into logical unit areas.

Thus, *Kuwata* does not teach or suggest transforming a device into a logical disk prior to creating any logical partitions for the device and modifying the logical volume management system to create the logical partitions for the device from the logical disk, as recited in claims 1, 10 and 19. In view of the above, Applicants respectfully request withdrawal of the rejection of claims 1, 10 and 19 under 35 U.S.C. § 103(a).

Since claims 3 and 12 depend from independent claims 1 and 10, respectively, the same distinctions between *Kuwata* and the invention recited in claims 1 and 10, apply to dependent claims 3 and 12. In addition, *Kuwata* does not teach or suggest transforming the logical disk into a logical partition, as recited in dependent claims 3 and 12. To the contrary, *Kuwata* teaches that a group of physical disks is logically divided into unit areas and the unit areas are combined into a logical disk. Thus, in addition to being dependent on their respective independent claims, claims 3 and 12 are also distinguished over *Kuwata* based on the specific features recited therein. Accordingly, Applicants respectfully request withdrawal of the rejection of claims 3 and 12 under 35 U.S.C. § 103(a).

II. 35 U.S.C. § 103, Alleged Obviousness Based on Kuwata and IBM

The Office Action rejects claims 2, 4, 11-18 and 20 under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Kuwata* (U.S. Patent Number 6,145,067) in view of *IBM* (IBM to release LVM Technology to the Linux). This rejection is respectfully traversed.

Since claims 2, 4, 11-18 and 20 depend from independent claims 1, 10 and 19, respectively, the same distinctions between *Kuwata* and the invention recited in claims 1, 10 and 19, apply to dependent claims 2-9, 11-18 and 20. In addition, the cited *IBM* reference does not provide for the deficiencies of *Kuwata* with regard to independent claim 1, 10 and 19. The cited *IBM* reference is an archive of an email correspondence with one of the inventors of the present invention discussing Logical Volume Management technology for Linux, which was written after the date of disclosure for the present invention.

The *IBM* reference is cited for disclosing the AIX device manager, AIX partition manager and AIX feature plug-ins. The *IBM* reference does not teach or suggest the features of transforming a device into a logical disk based on device information from a device driver, wherein the device is transformed into the logical disk prior to creating any logical partitions for the device and modifying a logical volume management system to create logical partitions for the device from the logical disk. Thus, any alleged combination of the cited *IBM* reference with *Kuwata* still would not result in the invention recited in claims 1, 10 and 19 from which claims 2-9, 11-18 and 20 depend. Accordingly, Applicants respectfully request withdrawal of the rejection of claims 2, 4, 11-18 and 20 under 35 U.S.C. § 103(a).

III. 35 U.S.C. § 103, Alleged Obviousness Based on Kuwata and Auslander

The Office Action rejects claims 5-7 and 9 under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Kuwata* (U.S. Patent Number 6,145,067) in view of *Auslander et al.* (U.S. Patent Number 5,129,088), hereinafter referred to as *Auslander*.

Since claims 5-7 and 9 depend from independent claim 1, the same distinctions between *Kuwata* and the invention recited in claim 1, apply to dependent claims 5-7 and

9. In addition, *Auslander* does not provide for the deficiencies of *Kuwata* with regard to independent claim 1.

Auslander teaches a mechanism for the creation of a logical volume, which includes only the minimum number of physical partitions on the disk required to store the file system. As more storage space is needed by the file system, a logical volume manager allocates an additional physical partition to the logical volume.

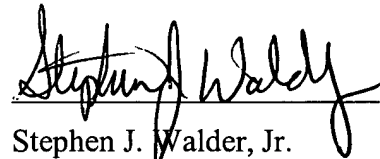
Auslander does not teach or suggest the features of transforming a device into a logical disk based on device information from a device driver, wherein the device is transformed into the logical disk prior to creating any logical partitions for the device and modifying a logical volume management system to create logical partitions for the device from the logical disk. Thus, any alleged combination of *Auslander* with *Kuwata* still would not result in the invention recited in claim 1 from which claims 5-7 and 9 depend. Accordingly, Applicants respectfully request withdrawal of the rejection of claims 5-7 and 9 under 35 U.S.C. § 103(a).

IV. Conclusion

It is respectfully urged that the subject application is patentable over the cited references and is now in condition for allowance. The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

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Respectfully submitted,



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